Modicon M340

Peripheral Remote I/O Adapter
BMX PRA 0100
User Manual

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This manual describes the architectures targeted with the **BMX PRA 0100** module, the characteristics of this module and its installation. It assumes that the user understands how to link PLCs using Ethernet.

Validity Note

This documentation is valid from Unity Pro 7.0.

Related Documents

Title of Documentation	Reference Number
Modicon M340 Using Unity Pro Processors, Racks, and Power Supply Modules Setup Manual	35012676 (Eng), 35012677 (Fre), 35013351 (Ger), 35013352 (Ita), 35013353 (Spa), 35013354 (Chs)

You can download these technical publications and other technical information from our website at www.schneider-electric.com.

Product Related Information

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Chapter 1
Architectures Targeted by the BMX PRA 0100 Module

Introduction

This chapter introduces the **BMX PRA 0100** module that allows Modicon M340 Remote I/O Stations to be managed by a Modicon Quantum or Premium Master PLC.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Basic Architecture with One Master PLC	10
Redundant Master PLCs	11
Restricted Capabilities of a M340 Remote I/O Station	12
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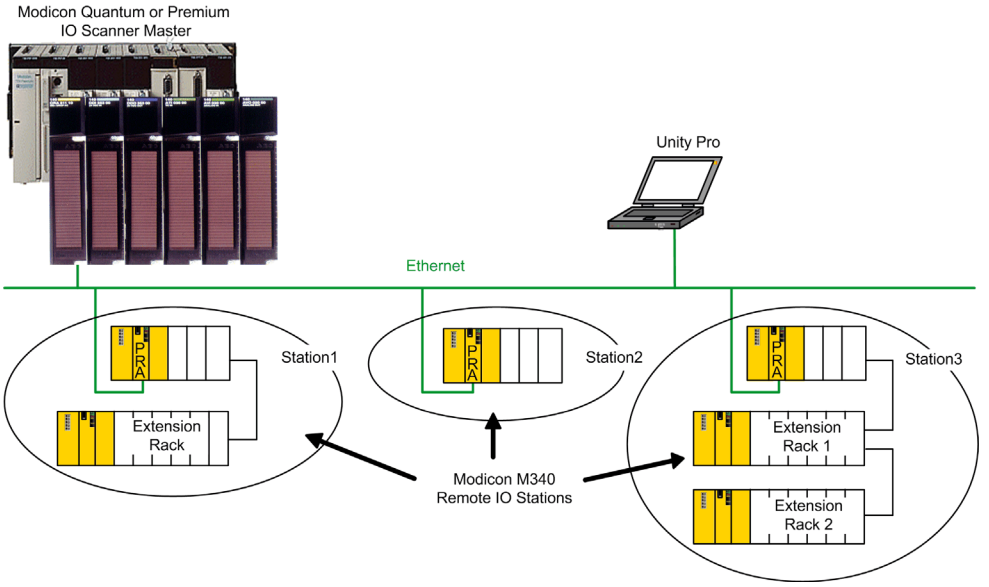
Basic Architecture with One Master PLC

One Master Example

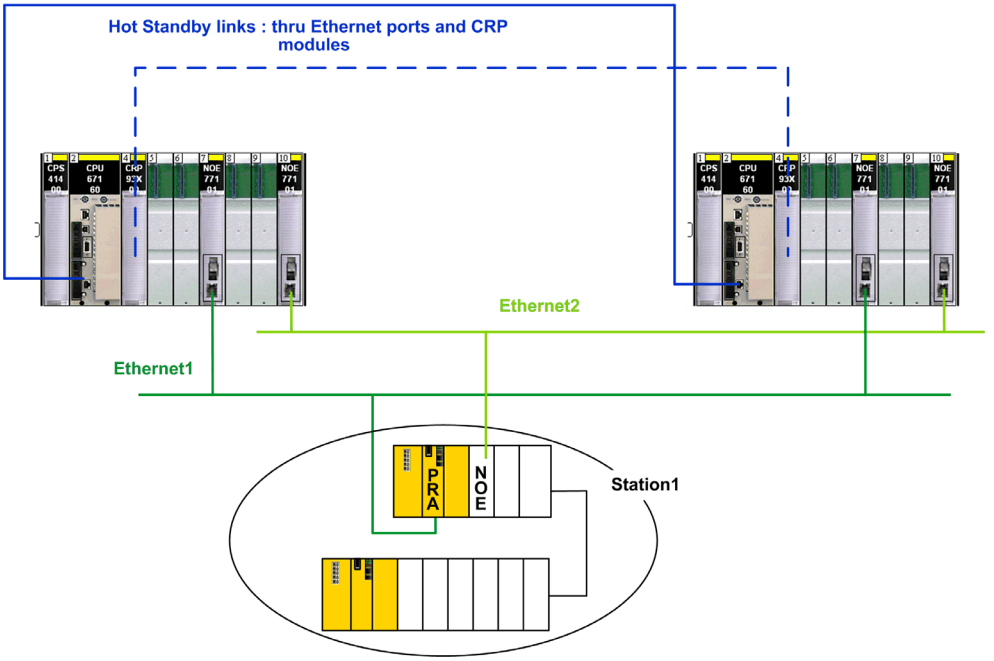
The following figure shows one Master PLC that controls 3 Remote I/O Stations.:



Redundant Master PLCs

Dual Link Example

The redundancy of the Dual Ethernet link to the Remote I/O Stations is performed with a **BMX NOE 0100** module and the embedded Ethernet port of the **BMX PRA 0100** module:



NOTE: Only redundancy of the Ethernet link (Ethernet medium) can be performed using this architecture. If the **BMX PRA 0100** module becomes inoperative, no exchange can be performed by the **BMX NOE 0100** module.

Restricted Capabilities of a M340 Remote I/O Station

Restricted Capabilities

For information about the restricted capabilities of a Remote I/O Station managed through a **BMX PRA 0100** module, refer to Restricted Capabilities of a Remote I/O Station *(see page 27)*.

BMX PRA 0100 Setup with Unity Pro

Unity Pro Application

Unity Pro V4.1 or higher must be used to make an application that is to be downloaded and executed by the **BMX PRA 0100** module.

The application manages the I/O objects to be exchanged with the Master PLC via the I/O scanning mechanism. For more information, refer to the BMX PRA 0100 Setup *(see page 33)*.

Chapter 2
Introduction to the BMX PRA 0100 Module

Introduction

This chapter provides introductory information about the **BMX PRA 0100**.

What Is in This Chapter?

This chapter contains the following topics:

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BMX PRA 0100 Physical Description	17

Introduction

Installation

The **BMX PRA 0100** module can be installed on BMX XBP xxxx racks. These racks must be supplied with a BMX CPS xxxx power supply module.

Functions

A **BMX PRA 0100** module manages the entire Peripheral Remote IO Station, which includes the following elements:

- Any discrete input/output modules
- Any analogue input/output modules
- One **BMX NOE 0100** Ethernet module (if necessary)

Main Characteristics

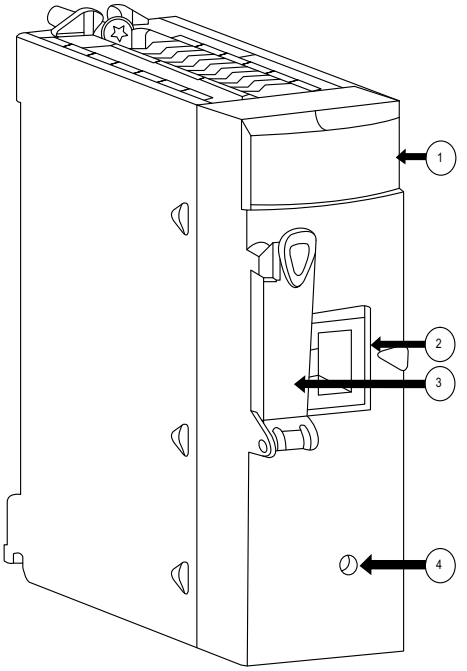
The following table shows the main characteristics of the **BMX PRA 0100** module:

Peripheral Remote IO Adaptor	Global Maximum Number of Digital Inputs/Outputs	Global Maximum Number of Analog Inputs/Outputs	Total Memory Size	Integrated Ethernet Connections
BMX PRA 0100	1024	256	448 KB: ● 96 KB for data. ● 352 KB for application (96 KB for system and 256 for the rest)	1

BMX PRA 0100 Physical Description

Illustration

The following figure is a **BMX PRA 0100**:



1 Display panel
2 Ethernet port
3 Protected memory card port
4 unused

Ethernet Link

In the Introduction to BMX P34 xxxx Processors documentation, refer to the Ethernet link *(see Modicon M340 Using Unity Pro, Processors, Racks, and Power Supply Modules, Setup Manual)* section.

Chapter 3
General Characteristics of BMX PRA 0100

Introduction

This chapter provides general information about the **BMX PRA 0100**.

What Is in This Chapter?

This chapter contains the following topics:

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General Characteristics of the BMX PRA 0100	21
Memory Characteristics of the BMX PRA 0100 Module	22

Electrical Characteristics of the BMX PRA 0100 Module

Peripheral Remote I/O Module Power Consumption

The following table shows the power consumption for the **BMX PRA 0100** module:

Peripheral Remote I/O Adaptor	Average Consumption
BMX PRA 0100	95 mA

Peripheral Remote I/O Module Dissipated Power

The following table shows the average dissipated power for the **BMX PRA 0100** module:

Peripheral Remote I/O Adaptor	Dissipated Power
BMX PRA 0100	2.3 W

General Characteristics of the BMX PRA 0100

Module Characteristics

The following table shows the general characteristics for the **BMX PRA 0100** module:

Characteristics			Available
Functions	Maximum number of	Digitial rack inputs/outputs	1024
		Analog rack inputs/outputs	256
		Expert channels	0
		Ethernet channels	2
		AS-i Field Bus	0
		Simultaneous communication EF	16
	Maximum number of modules	USB	0
		Embedded Serial Modbus link port	0
		Embedded Ethernet port	1
	Savable real-time clock		Yes
Savable Application Data Memory Capacity			96 KB
Application Structure	MAST task		1
	FAST task		0
	Event processing		0
Application Code Execution Speed	Internal RAM	100% Boolean	8.1 Kins[1]/ms
		65% Boolean + 35% digital	6.4 Kins[1]/ms
Execution Time	One basic Boolean instruction		0.12 µs
	One basic digital instruction		0.17 µs

1 Kins: 1024 instructions (list type)

Memory Characteristics of the BMX PRA 0100 Module

Memory Size of Located Data

The following table shows maximum memory size of the located data in the **BMX PRA 0100**:

Type of Object	Address	Maximum Size	Default Size
Internal bits	%Mi	2000	512
Input/Output bits	%Ir.m.c %Qr.m.c	1	1
System bits	%Si	128	128
Internal words	%MWi	3000	1024
Constant words	%KWi	512	128
System words	%SWi	168	168

1 Depends on the equipment configuration that is declared (input/output modules).

Non-Located Data

The types of Non-Located Data are:

- Elementary Data Types (EDT)
- Derived Data Types (DDT)
- DFB and EFB function block data

Total Data Memory

The total size of located and non-located data is limited to 96 Kilobytes for the **BMX PRA 0100** module.

Chapter 4
Installation of the BMX PRA 0100

Installation of the BMX PRA 0100

BMX P34 CPUs

For installation details, refer to Installation of BMX P34 xxxx Processors *(see Modicon M340 Using Unity Pro, Processors, Racks, and Power Supply Modules, Setup Manual)*. During the installation be sure to follow recommendations about the **BMX PRA 0100** limitations *(see page 27)* (for example, an SD-card with a file storage system cannot be installed in this module).

Chapter 5
Diagnostics of the BMX PRA 0100 Module

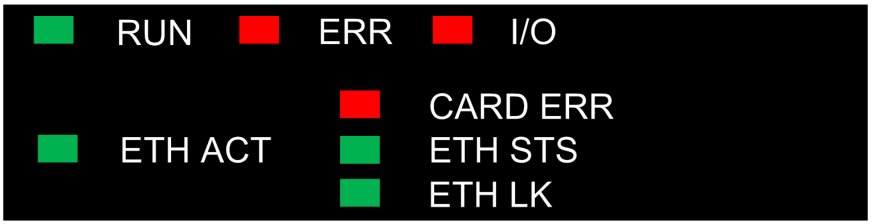
BMX PRA 0100 Diagnostics

BMX P34 CPU Diagnostics

For information about the **BMX PRA 0100** diagnostics, refer to BMX P34 xxxx Processors Diagnostics *(see Premium, Hot Standby with Unity, User Manual)*.

BMX PRA 0100 Display

The **BMX PRA 0100** display is different from the BMX P34 CPU displays as shown in the following figure:



Chapter 6
Restricted Capabilities of a Remote I/O Station BMX PRA 0100

Introduction

This chapter includes information about the capabilities, modes of operation, and compatibility.

What Is in This Chapter?

This chapter contains the following topics:

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Characteristics	28
Application Compatibility	30

Characteristics

Introduction

The **BMX PRA 0100** language and configuration capabilities are almost the same as the BMX P34 CPUs *(see Modicon M340 Using Unity Pro, Processors, Racks, and Power Supply Modules, Setup Manual)*: Unlocated Data, DDT, IODDT, Array, Floating, EFB, FBD, Diagnostics, Cold start only, etc.

The exceptions for the **BMX PRA 0100** are given below in the restrictions section *(see page 28)*.

Remote I/O Station Capabilities

A Modicon M340 Remote I/O Station with a **BMX PRA 0100** has the following characteristics:

Characteristic	Available
Configuration Capabilities	
Number of racks (4-, 6-, 8- or 12-slot)	4
Digital channels	1024
Analog channels	256
Ethernet networks	2
Counting channels	0
Motion channels	0
CANopen fieldbus	0
AS-Interface	0
Communication Capabilities	
Embedded Serial Link ports	0
USB ports	0
Serial Link ports (**BMX NOM 0200** module)[2]	4
FactoryCast (**BMX NOE 0110** module)	0
Global Data Service[1]	None
I/O Scanner Master[1]	None
Application Structure	
MAST Task	1
FAST Task	0
I/O Events	0
Timer Events	0
Symbols Database support	None
Memory Service	

Characteristic	Available
Support of SD-Card without file system (**BMX RMS 008MP**)	Yes
Support of SD-Card with file system	No
Support of Application backup	Yes
Other Services	
WEB Services	None

1 When a **BMX NOE 0100** module is configured in the Remote I/O Station, the module cannot perform these services.
2 A maximum of 4 configured channels (with 2 to 4 modules).

Application Compatibility

SD Card Application Restriction

An application on a SD Card designed for the **BMX PRA 0100** can only be executed on a **BMX PRA 0100**. It cannot be executed on the BMX P34 CPUs.

Import/Export mechanism

The master *.STA file generated in Unity Pro v6.0 cannot be fully opened in Unity Pro v7.0. Slave projects are saved in *.STU format that are not compatible when updating Unity Pro *(see Unity Pro, Program Languages and Structure, Reference Manual)* from one version to another.

Here below is described the way to fully retrieve the master *.sta and the *.stu slave applications:

In Unity Pro v6.0

- Export Master BMX PRA 0100 Project *(see Unity Pro, Program Languages and Structure, Reference Manual)*
  - *.ZEF file (Full Application Exchange Files) to import a global project with global DTMs configuration
  - *.XEF file (Application Exchange Files) to import a global project without global DTMs configuration
- Export slave BMX PRA 0100 project
  For All BMX PRA 0100 restore the slave project:
  - launch the **I/O Scanning**
  - select a slave BMX PRA 0100
    A new Unity Pro window opens
  - **File →Export**
  - The global project *.ZEF or *.XEF files

In Unity Pro v7.0

- Restore Unity Pro master project File *(see Unity Pro, Program Languages and Structure, Reference Manual)*
  - **File →Open**
  - The global project *.ZEF or *.XEF files saved in Unity Pro v6.0 to be selected
- Restore Unity Pro slave project files
  For All BMX PRA 0100 restore the slave project:
  - launch the **I/O Scanning**
  - select a slave BMX PRA 0100
    A new Unity Pro window opens
  - **File →Open**
  - The global project *.ZEF or *.XEF files saved in Unity Pro v6.0 have to be selected
- Save Project *(see Unity Pro, Program Languages and Structure, Reference Manual)*

NOTE: This migration can also be achieved using **Save Archive**.

In Unity Pro v6.0

- Save the master Archive *(see Unity Pro, Program Languages and Structure, Reference Manual)*
  - **File →Save Archive**
- Save the slave Archive *(see Unity Pro, Program Languages and Structure, Reference Manual)*
  - launch the **I/O Scanning**
  - select a slave BMX PRA 0100
    A new Unity Pro window open
  - **File →Save Archive**

In Unity Pro v7.0

- Open master Archive *(see Unity Pro, Operating Modes)*
  - **File →Open**
  - The archive `*.STA` file saved in Unity Pro v6.0 have to be selected
- Open slave Archive
  - launch the **I/O Scanning**
  - select a slave BMX PRA 0100
    A new Unity Pro window opens
  - **File →Open**
  - The archive `*.STA` file saved in Unity Pro v6.0 have to be selected
- Save Archive *(see Unity Pro, Program Languages and Structure, Reference Manual)*

Chapter 7
BMX PRA 0100 Setup

Introduction

This chapter explains how to use Unity Pro and the Unity Loader and how to setup the **BMX PRA 0100**.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
7.1	Setup Using Unity Pro	34
7.2	Setup of the BMX PRA 0100	37
7.3	Using Unity Loader	40

Section 7.1
Setup Using Unity Pro

Introduction

This section provides information about configuring, programming and connecting the **BMX PRA 0100**.

What Is in This Section?

This section contains the following topics:

Topic	Page
Configuring and Programming the BMX PRA 0100	35
Connecting Unity Pro to the BMX PRA 0100	36

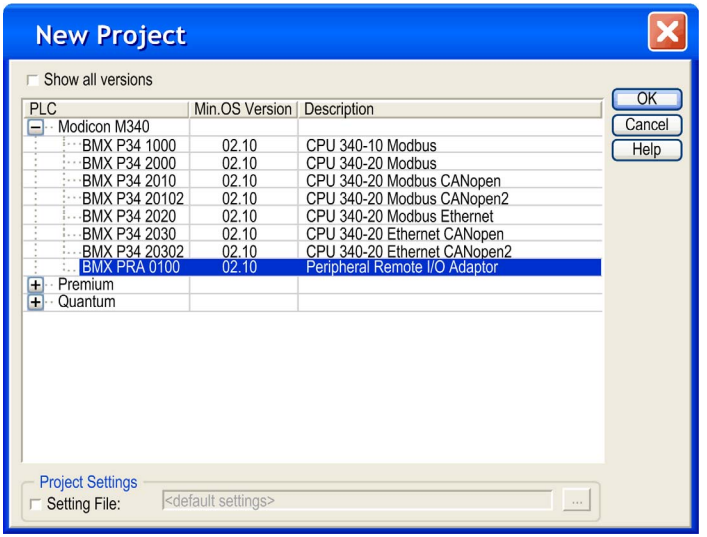
Configuring and Programming the BMX PRA 0100

Introduction

BMX PRA 0100 is configured and programmed through Unity Pro version 4.1 or higher.

CPU Catalogue

The **BMX PRA 0100** version 2.10 is part of the Unity Pro standard CPU catalogue:



Connecting Unity Pro to the BMX PRA 0100

Connecting Media

Ethernet is the only media for connecting Unity Pro to the **BMX PRA 0100**, refer to the Ethernet CPU or NOE modules documentation to operate such a connection, particularly how to initialize IP addresses.

Unity Pro manages the **BMX PRA 0100** connected modes exactly as it does with the BMX P34 CPUs.

Section 7.2
Setup of the BMX PRA 0100

Introduction

This section provides information about installing a **BMX PRA 0100** module and the certificates that apply to it.

What Is in This Section?

This section contains the following topics:

Topic	Page
BMX PRA 0100 Installation Procedures	38
Certifications	39

BMX PRA 0100 Installation Procedures

Installation

To install a **BMX PRA 0100**, refer to Installing the BMX P34 xxxx Processors *(see Modicon M340 Using Unity Pro, Processors, Racks, and Power Supply Modules, Setup Manual)*.

Certifications

BMX PRA 0100 Certificates

All standard certifications common to all modules of the M340 range also apply to the BMX PRA 0100 module.

Section 7.3
Using Unity Loader

Introduction

This section provides information about connecting the Unity Loader and firmware updates.

What Is in This Section?

This section contains the following topics:

Topic	Page
Connecting the Unity Loader	41
Upgrading BMX PRA 0100 Firmware	42

Connecting the Unity Loader

Connecting Unity Loader

Ethernet is the only media used for connecting the Unity Loader to the **BMX PRA 0100** module.

Upgrading BMX PRA 0100 Firmware

Unity Loader Management

Unity Loader manages the **BMX PRA 0100** as an BMX P34 xxxx processor. It displays the correct product designation, "BMXPRA0100 Peripheral Remote I/O Adaptor", on both the ldx file and connected device sides.